

## HALLUCINATIONS: THEIR MECHANISM AND SIGNIFICANCE\*

JAMES A. CUTTING, M.D.

*Agnew*

AN hallucination differs from an ordinary thought or a recalled memory chiefly by its vividness and its feeling tone. The fact that a woman upon hearing her name called as she is about to start on a shopping tour is impelled to turn back, search each room, examine every closet, and look under all the beds, in order to determine from whence and from whom the strange voice came, illustrates not only the vividness of the hallucination but also an associated feeling of awe and fear.

Hallucinations are frequently encountered in sleep, epilepsy, the psychoses, toxic conditions, hypnosis, and on occasions, even in the so-called normal individual. It is a matter of record that such famous characters as St. Paul, George Fox, Joan of Arc, as well as a host of others, have experienced hallucinatory phenomena which have influenced the course of history.

### CURRENT THEORIES OF CORTICAL FUNCTION

In order to better understand the mechanisms of hallucinations, it might first be well to summarize some of the current theories of cortical function. The acquisition of a cerebrum makes it possible for man to dominate the rest of the animal kingdom, since it enables him to employ memory, judgment and delayed action when confronted with a given situation. The cortex is constantly bombarded by sensory stimuli which enter its specialized centers; these are compared with previous sensations and correlated with those from other areas. Thus cognition is established. Through association fibres contact is made with the frontal lobes where these cognitions are synthesized and form the basis of thought, reason, judgment and imagination.

According to Tilney and Riley<sup>1</sup> the thalamus still retains much of its primitive power of providing a feeling tone for the many sensory stimuli passing through it on the way to the cortex. By means of cortico-thalamic connections this primitive feeling tone of fear, anger, pleasure, sex and the like are kept under control by the cortex. Should this control be lost, a pathological expansion of the emotions would result producing a neurosis or a psychosis.

### RELATION TO DISSOCIATED STATES OF MIND

It is commonly stated that hallucinations thrive best in dissociated states of mind, and it is in sleep, epilepsy, toxic states and the psychoses that we find these dissociations actively at work. In the process of going to sleep, as we snuggle down in bed, we automatically shut out a stream of sensory stimuli from the organs of sight,

hearing, equilibrium, and the like, which, according to Rosett,<sup>2</sup> ordinarily keep us oriented and direct our thought and judgment. As a result, control over the thalamus is lost and thus we fall back on a more primitive way of thinking—a vivid, thalamic, emotional, hallucinatory way. Our thoughts now come to us as dream pictures; condensed, vivid images made of more primitive stuff, which pass before us as hallucinations in the form of a moving picture as it were, or as a moving picture with the addition of a sound tract.

The same mechanism is found in the dissociated minds of the epileptic.<sup>3</sup> By a narrowing of his sensory fields he often experiences hallucinations which precede the convulsion, consisting of flashes of light, the ringing of bells, visions of heaven and the like.

The worries, fears and anxieties of the dissociated psychotic are greatly exaggerated when viewed through his thalamic tinged mind, all of which is made doubly convincing by the accompanying hallucinations—since to see and to hear is to believe. That this same expanded feeling tone occurs in sleep is shown by one of my own recent dreams. In this dream I was delivering an eloquent speech before a huge audience. As I awakened, I was able to remember for a few moments my closing remark which I found myself mumbling aloud. It consisted of a jumble of unintelligible monosyllables—the condensed verbal symbols depicting the climax to my great speech—truly a rude awakening!

Many patients have told me on recovering from their upsets that in retrospect their psychoses seem like dreams or horrible nightmares; and like dreams some soon fade away, others are remembered. In our dreams the most absurd things seem perfectly real but on awakening we see their incongruity; likewise on awakening from their upsets the hallucinations of the psychotics seem just as absurd to them. Alcoholics suffering from a delirium have said that it was often impossible for them to distinguish between their dreams and their hallucinations.

### ILLUSIONS

Illusions are, as it were, mild forms of hallucinations in which one misinterprets what one sees or hears. These are common and we have all probably experienced them. They are especially apt to occur in a state of expectancy or stress. Thus, as one walks along a lonely forest path at dusk, he feels a primitive instinct pulling at the roots of his hair as he misinterprets the outlines of a stump for a crouching mountain lion. The following case illustrates the way in which these illusions may direct the thoughts of a dissociated, complex-filled mind. Mrs. A. was a 45-year-old, divorced instructor and university graduate: "I could see pictures in the sky of bears and icebergs," she said: "They were really images in the clouds but they were so perfect I can't figure out how they did it. I thought someone at the University was trying to amuse me.

\* Chairman's address. Read before the Section on Neuro-Psychiatry at the Seventy-first Annual Session of the California Medical Association, Del Monte, May 3-6, 1942.

From the Agnew State Hospital, Agnew, California.

The bears moved rapidly and they naturally suggested the University of California and they seemed to be driving off the icebergs. They were going to make it warmer down at Stanford. I've always been busy but I thought they might warm up more toward me and invite me down. I saw a camel, too, and that suggested Dr. Campbell (a former professor). I thought it quite wonderful. It was just like a moving picture and I'd give two cents to know how they did it."

#### REPORT OF CASES

As an example of the way these conflicts and buried complexes can be projected back to the individual in the form of hallucinations, the following case is cited.

CASE 1.—Mrs. F., was a very obese, untidy, sloppy nurse committed to the hospital because of an excessive indulgence in alcohol and paregoric. Shortly after entry she complained bitterly that the attendants were calling her a big dirty slob, and that one loud voiced nurse was reading an old diary she had written years ago. She was outraged that this very personal stuff should be brought out and read to the whole ward. She was of course protesting against the obvious fact that she was the big dirty slob the voices were calling her, but which she would not consciously admit. The old diary likewise was a reflected hallucinatory memory, charged with emotion.

How gradual the transition sometimes is from illusion to hallucination, and from hallucination to delusion, is illustrated in Case 2.

CASE 2.—Mrs. G., a woman of 46, who entered the hospital in a manic condition. By looking at the bare, discolored walls of her room, certain spots would gradually turn into flowers and tropical forests. Soon she was able to see these beautiful visions with her eyes closed or when she put her head under the bed-covers. On one occasion she saw a procession of faces flash before her. One of these images seemed to be that of the badly scarred face of her dead mother (her mother had died of burns when patient was only five). The patient was given continuous baths, and here half floating in a tub of warm water, she said she experienced a most heavenly feeling—so heavenly in fact, that at length she imagined she really was in heaven. She thought the nurses in white uniforms and caps were angels waiting on her. Believing her mother was also in heaven, she asked one of the angels to find her mother so that they might visit together.

The case of F. M. is cited to show to what lengths this patient went to understand and control his hallucinations.

CASE 3.—"At one period of my life," he states, "I engaged in the study of the workings of the brain, mind and soul, and the mystery in which it was encompassed." He was a 48-year-old, single plumber, with a common school education and diagnosed as a case of tabes with psychosis. One year following the death of his mother he experienced his first hallucination. On returning home from work, he had thrown himself on his bed and had fallen asleep. "Suddenly sometime after midnight I started up and saw a big ball of fire in my coat. I slapped myself to make sure I was awake and then

reached for the flaming ball. It gradually rose to the ceiling and floated out the window. It must have been the spirit of my dead mother which was trying to guide me. I had resolved to consult her in the other world if possible."

Auditory hallucinations began about seven years before entering the hospital. He first heard a man's voice talking in his left ear in a low bass voice; later a woman's voice, very cold and icy, began talking to him in his right ear. "They talk so dirty," he said, "that really they soil my thoughts."

For several nights before coming to the hospital these voices had been very disturbing. Unable to sleep, he had walked the streets all night. "I thought a mob was after me so I took to the hills. I slept under the bushes, and passed through rooms of skeletons and ghosts. I walked in circles. Down the road I saw a silver goose. I knew it was not there but still I saw it. I went over and put my hand right through the goose, but still I could see it. Voices kept telling me to commit suicide 'it was the easiest way out.' Finally in desperation I did slash my throat and wrists with a razor. I was in such a frenzy it did not hurt. I thought I had control of the ether. Then it seemed the world lost its equilibrium and Africa sank out of sight, then Europe. As I stood on the top of the mountain waving my arms a voice shouted, 'What a wonderful man; what powers you have attained!'"

On entry to the hospital he was still actively hallucinated. He described the voices as having a whistling sound—"If you ever heard a person with a kind of whistling voice talking through a tube, that is the way it sounds. Sometimes a voice says 'the hallucinations will now commence' and I will see a tiny speck of violet or purple light, and then images of hideous faces appear. Sometimes I will hum a tune and the two voices will sing the words. I stop humming but they go on with the words—it's most disagreeable. Yesterday I began singing a song when simultaneously they began singing a lively tune quite different from the slow movement of the song I was singing. While praying, the voices interpolate vulgar words and I have to cease praying." Sometimes the voices call him a maniac, a syphilitic, a gourmandizer, and then get to fighting among themselves, each trying to making the other keep quiet and all the while the patient, as a bystander, merely listens in. One day he thought the examiner had made a mechanical device that would produce every conceivable sort of a sound. One after another these sounds were tested on him so that he would be able to tell the real sounds from the hallucinations. When he talks with someone, the voices do not bother but whenever there is a lull in the conversation, or he stops to meditate, the voices immediately start shouting. Patient says "there seems to be a conflict between my inner and outer mind. The voices seem to get hold of my inner mind."

Sometimes the voices made him laugh outright. While straining to bend an iron bar, he heard one of the voices grunt for him, whereupon the patient said to the voice, "One would think you were doing this work" and the voice replied, "You're damn right, you make us work like hell." On occasions when he cannot think of a word the voices would shout it at him and then curse him. When they bother him too badly, he will try to trip them up by suddenly asking "8 and 6 and 5 are how many?" The voices reply, "We don't know, we are fools." Whenever he passed through the engine room with its roaring fires he noted that the voices would become much louder, then as he passed out into a quieter room the voices would diminish in volume. "Adjusting the gasoline torch causes a variation in volume of the voices," he states, "a shout when it is on full blast to almost silence when shut off. The ringing of a bell

causes almost a horror between the sound as it hits the ear drum and the interior shout." "One day," he relates, "as I crawled into a large iron tank, to my astonishment, the tank vibrated on all sides, ringing back what was being shouted within my head. I was so surprised that I withdrew and stood for a moment thinking. I then varied the speed with which I entered and left the tank. A change took place so quickly that half of a word sounded afar and the balance almost within my head." He observed while hammering, that as the hammer hit the anvil, at that instant the voice became very loud. He thought to trick the voice and stopped the hammer just before it reached the anvil. The voice shouted as though the hammer had struck. He tried this many times with the same result, and then the voice began cursing him in a "horrible manner."

"Once the voices asked 'what are you thinking about,' then started giving me orders and suggestions. Finally I replied 'This is my conscious life, I am the judge,' to which they replied, 'We admit we are in a house of bondage,' then added quickly, 'we tell you too much.'" The patient further observes, "Conscious thoughts of a most casual nature are taken up by the highly alarmed subconscious, are magnified a thousand times, and then break in on the conscious operations. The voice I call number one repeats with astounding rapidity; a lengthy thought that would take thirty seconds or more to speak is repeated back in two seconds. New music that requires conscious attention to read, pleases the subconscious and causes almost complete silence of the voices. On the contrary what is known as ragtime, causes a most distressing condition and has the same effect as the boiler room."

"The following are some of the verbatim subconscious expressions as I receive them:

"This is sanity, not insanity."  
"You're as sweet as an appleblossom."  
"Almighty God you are a difficult patient to gormandize."  
"The alphabet no longer runs from A to Z."  
"I'll shoot you yet. Let us kill ourselves."

*Comment.*—Thus the hallucinations of this patient follow closely the pattern of the dissociated dream mind. The rather silly verbatim expressions of the "subconscious" are in reality basic and full of significance to the patient. At times he is able to gain a measure of insight then again the dissociation becomes so great that he is lost in complete confusion. That the hallucinated material may form strange combinations with reality is shown when he hallucinates the silver goose onto the actual road upon which they both stand. This differs from the usual dream mechanism which of necessity hallucinates the whole picture—actors, stage settings and all. However, a somewhat unique resemblance is shown between the hallucinations and a dream condition known as a "dream within a dream," when the patient, by means of a delusional device, hallucinates a variety of sounds in order to test these sounds with those he knows are being hallucinated.

STUDY OF 100 CONSECUTIVE PSYCHOTIC PATIENTS

In a study of 100 consecutive psychotic patients admitted to Agnews State Hospital I found that of these 74 per cent had hallucinations, 64 per cent were auditory in nature, 40 per cent vis-

ual, and 28 per cent had a combination of both auditory and visual; 83 per cent of the schizophrenics had hallucinations of which the auditory led the visual in the proportion of 19 to 11. Of the Manic Depressive 50 per cent had hallucinations, the auditory leading 9 to 6. It would appear from these figures that since the less malignant psychoses such as the Manic Depressives and Alcoholics have a more even balance of visual and auditory hallucinations, the visual hallucinations in general have a better prognosis than the auditory. It is of importance to note whether or not the patient's actions are directed by the voices.

TABLE 1.—Analysis of 100 Consecutive Psychotic Patients Admitted to Agnew State Hospital

	No. of Cases.	Audi- tory.	Vis- ual.	Both	Olfac- tory.	Others Types.	Without Halluci- nations
PSYCHOSIS							
Dementia Precox....	24	19	11	7	2	1	4
Manic Depressive....	20	9	6	4	..	..	10
Psychosis With							
Cerebral Ar- teriosclerosis .....	16	7	4	1	..	..	4
Alcoholic Psychosis..	15	14	11	10	1	1	0
Paresis .....	7	3	1	0	..	..	3
Involutional							
Melancholia .....	7	3	0	0	..	..	4
Senile .....	5	4	2	2	..	..	1
Epilepsy .....	2	1	2	1	..	..	0
Others .....	4	4	3	3	..	..	0
	100	64	40	28	3	2	26

IN CONCLUSION

In conclusion it might be noted that since dreams are in essence the hallucinatory thoughts of a dissociated mind, and inasmuch as we all dream, it is evident that much of our lives are spent as bedfellows of the insane. Each morning we should indeed be thankful that we awaken to at least a degree of sanity.

SUMMARY

In this presentation it is pointed out that hallucinations differ from ordinary thoughts, or recalled memories, chiefly by their vividness and feeling tone. The underlying mechanism of dreams and hallucinations is shown to be similar as illustrated by actively hallucinated patients. An investigation of a series of one hundred psychotics indicates that auditory hallucinations are more frequent than visual, while the visual appear less malignant than the auditory.

Agnew State Hospital

REFERENCES

1. Tilney, F., and Riley, H. A.: The Form and Functions of the Central Nervous System. Paul B. Hoeber Inc., New York, 1938.  
2. Rosett, Joshua: The Mechanism of Thought. Columbia University Press, New York, 1939.  
3. Cutting, James A.: Epilepsy. A General Survey of the Convulsive State. Calif. and Western Med., 53: 170-173, Oct. 1940.

The healthy know not of their health, but only the sick: this is the Physician's Aphorism. Thomas Carlyle, *Characteristics*.